

Corpus Christi, Tex. 11th, Tribune, Kans. 12th, Salina, Kans. 13th, Salina and Tribune, Kans. 14th, Helena, Mont. 17th, Tribune, Kans.; Marquette, Nebr. 18th, Webster, Dak.; Marquette, Nebr. 20th, Salina, Kans.; Fairbury, Nebr. 23d, Marquette, Nebr. 27th, Webster, Dak.

## SAND STORMS.

Fort Grant, Ariz., 15th; Willcox, Ariz., 17th, 28th, 29th. Fresno, Cal., 18th. Fort Mojave, Ariz., 18th, 27th; Yuma, Ariz., 19th, 20th. Las Vegas, N. Mex., 29th.

## VERIFICATIONS.

## INDICATIONS FOR 33 HOURS IN ADVANCE.

The percentages of verifications of the tri-daily indications for February, 1888, as determined from comparison of succeeding telegraphic reports, are given in the table below.

The predictions for all districts east of the Rocky Mountains for February, 1888, were made by 1st Lieutenant H. H. C. Dunwoody, 4th Artillery, U. S. Army, Acting Signal Officer and Assistant, except those for Minnesota and Dakota, which were made at Saint Paul, Minn., by 1st Lieutenant Thomas M. Woodruff, 5th Infantry, U. S. Army, Acting Signal Officer; those for the Pacific coast districts were made at San Francisco, Cal., by 2d Lieutenant J. E. Maxfield, Signal Corps; the verifications for all districts were determined by Junior Professor C. F. Marvin.

Percentages of indications verified, February, 1888.

States.		States.	
Maine.....	83.38	Kentucky.....	80.69
New Hampshire.....	84.00	Ohio.....	80.83
Vermont.....	77.66	West Virginia.....	80.66
Massachusetts.....	83.56	Indiana.....	82.66
Rhode Island.....	81.45	Illinois.....	80.34
Connecticut.....	86.24	Lower Michigan.....	80.69
Eastern New York.....	81.31	Upper Michigan.....	77.28
Western New York.....	79.72	Wisconsin.....	82.10
Eastern Pennsylvania.....	81.69	Minnesota*.....	73.97
Western Pennsylvania.....	82.17	Iowa.....	79.59
New Jersey.....	80.79	Kansas.....	84.69
Delaware.....	79.48	Nebraska.....	78.76
Maryland.....	82.93	Missouri.....	80.14
District of Columbia.....	82.10	Colorado.....	81.31
Virginia.....	78.21	Dakota*.....	70.93
North Carolina.....	81.03	Southern California*.....	82.03
South Carolina.....	79.59	Northern California*.....	81.48
Georgia.....	78.52	Oregon*.....	82.89
Eastern Florida.....	78.66	Washington Territory*.....	77.90
Western Florida.....	74.31	By elements:	
Alabama.....	75.10	Weather.....	83.58
Mississippi.....	79.13	Wind.....	77.48
Louisiana.....	78.86	Temperature.....	77.54
Texas.....	79.59		
Arkansas.....	78.83	General average.....	80.55
Tennessee.....	81.38		

\* In determining the general average percentage for the different elements, Minnesota, Dakota, and the Pacific coast states have not been included.

## CAUTIONARY SIGNALS.

Of the total number of cautionary and storm signals ordered during February, 1888, it was practicable to determine the justification or failure of twenty-eight; justified, twenty-five, or 89.29 per cent. Of the above, twelve were ordered for cautionary signals; number justified, ten, or 83.33 per cent. Sixteen storm signals were ordered; justified, fifteen, or 93.75 per cent. Total number of direction signals ordered, twenty-seven, all, or 100 per cent., of which were justified, five signals being ordered for easterly winds, and twenty-two for westerly winds. Number of storms without signals, thirteen.

## STATE WEATHER SERVICES.

The following extracts are republished from reports for February, 1888, of the directors of the various state weather services:

The "Alabama Weather Service," P. H. Mell, jr., of the Agricultural and Mechanical College, Auburn, director:

The month had no special features to distinguish it from Februarys of previous years. Only two cold waves passed over the state, and they were not severe. The average temperature was 2°.4 above the normal. In some portions of the state considerable rain fell, but yet the average was about normal.

The winter has been quite mild, and but few days occurred that were really cold and disagreeable. Rainy days, however, were frequent. The warm days

towards the latter part of the winter brought forth the early buds on the fruit trees and in the forests, but many of the tender germs were destroyed by the cold wave that passed over the state on the 26th of February. There is, however, a good prospect for a fair yield of fruit, because many of the buds were not far enough advanced to be materially affected by the cold snap.

## Summary.

Temperature (in degrees Fahr.).—Monthly mean, 51.6; highest monthly mean, 66.1, at Newton; lowest monthly mean, 38.8, at Chattanooga; maxi-

Number of signals ordered late, *i. e.*, after the justifying velocity had begun, eight, or 28.57 per cent.

## COLD-WAVE SIGNALS.

Total number of cold-wave signals ordered from Office Chief Signal Officer, one hundred and eighty; justified, one hundred and fifty-five, or 86.11 per cent. One hundred and eighteen cold-wave signals were ordered during the month by the Signal Service Officer at Saint Paul, Minn., of which, ninety-eight, or 83.05 per cent., were justified.

## LOCAL VERIFICATIONS.

The following extracts from the published reports of the several state weather services for February, 1888, show the percentages of verification of weather and temperature signals for the various states:

Indiana.—La Grange: the indications received during February were the best and most correct since they have been sent here; 100 per cent. for state of weather and 97 per cent. for temperature were verified.

Seymour: The indications are growing in favor with the people; 87 per cent. were verified.

Michigan.—Weather and temperature signals are now displayed in one hundred and forty-three towns in the state, and on the baggage-cars of twenty-six trains on eight principal railroads of the state.

The indications and cold-warnings are issued by the Chief Signal Officer and distributed to the different stations through the central office. The indications are issued at 1 a. m., daily, from the Chief Signal Office, Washington, and are for the twenty-four hours from 7 a. m. to 7 a. m.

The percentage of verification of these indications for February is as follows (the verification is taken from reports of displaymen furnished this office monthly): weather, 84.8 per cent.; temperature, 81.6 per cent.

The percentage of verification of weather predictions for February on the D., G. H., and M. R'y., is 87.0 for weather, and 81.3 for temperature; on the C. & G. T. R'y., weather, 86.7, and temperature, 88.0; P. H. & N. W. R'y., weather, 90.0, and temperature, 87.0; M. C. R'y., for weather, 88.3, and for temperature, 87.0; G. R. & I. R'y., weather, 83.8, and temperature, 85.0; C. & W. M. R'y., weather, 85.0, and temperature, 88.3; P. O. & P. A. R'y., weather, 90.0, and temperature, 87.0.

Minnesota.—The percentage of verification of weather signals was 80 for weather, and 76 for temperature.

Nebraska.—The percentages of correct predictions for the state are as follows: temperature, 86.2; weather, 83.3; mean, 84.8.

Nevada.—The display of signals at Carson City, which has been done regularly since October 4, 1887, has given great satisfaction to the citizens of that place and vicinity, and so generally have the indications been verified that there is reason to hope that they will be of great benefit to the interests of Nevada.

Oregon.—The weather indications displayed at Albany, Salem, and Roseburg, were verified as to weather 78 per cent., as to temperature 77 per cent. These indications are telegraphed at 2 p. m. daily from San Francisco, and are for the twenty-four hours commencing at 7 p. m. date of receipt of telegram.

South Carolina.—The percentages of verifications of the weather and temperature predictions for the whole state was: for weather, 86.8; for temperature, 90.1.

Tennessee.—The percentage of verification of the daily weather and temperature predictions, issued from the Signal Office at Washington to the various stations were, for the state: weather, 88.9 per cent.; temperature, 88.8 per cent.